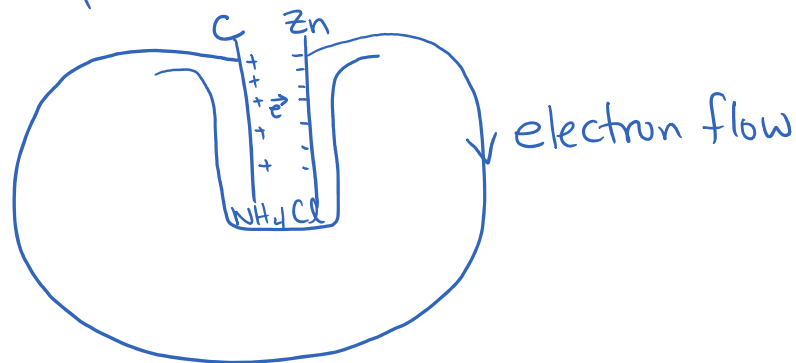


6.1 Current events in history

December 15, 2017 12:50 PM

History: Galvani + Volta in 1700's, frogs

- battery - 2 or more cells connected together
- cells have 2 electrodes in a solution or paste such that if the rods are connected to a conducting path, an electric current is produced.



- Emf - the peak value of the potential difference for a battery (highest it can be, might be above or below the official rating)
- electromotive force = \mathcal{E} $\Delta V = \frac{E_p}{Q}$

* voltage (energy each e^- has as it moves around the circuit)

- current - when electric charges flow, requires a continuous conducting path
- the amount of charge passing a point per second

Current \rightarrow $I = \frac{Q}{t}$ charge time in seconds $[Ampere] = [A] = \left[\frac{C}{s}\right]$

$1A = 6.24 \times 10^{18} \frac{e^-}{s}$

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* current (# of e^- flowing past)

- electrons actually move, but by convention current is defined to flow from pos to neg, as if positive charges were flowing
→ "conventional current"

- drift velocity - e^- actually move slowly in circuits
 - they collide with other particles along the way, transferring thermal energy (heating of wire)
 - $0.04 \frac{\text{mm}}{s} \times \frac{1 \text{ m}}{1000 \text{ mm}} \times \frac{1 \text{ km}}{1000 \text{ m}} \times \frac{3600 s}{1 \text{ h}} = 1.44 \times 10^{-4} \frac{\text{km}}{\text{h}}$
 $= 0.000144 \frac{\text{km}}{\text{h}}$ Very Slow!

- string of Christmas light all on instantaneously because, like marbles or a train, if you move the first one, the rest move too.

Circuit - a complete loop containing a battery, wires, device to use the electrical energy.

- see pg 224 for common symbols

wire ———
 switch ———
 bulb —○— ⊗

battery $\begin{array}{c} \text{+} \\ | \\ | \\ \text{-} \end{array}$
 resistor ———
 ammeter —(A)— series
 voltmeters —(V)— parallel

Practice pg 225 # 1-3

pg 226 # 1-2 ← read pg 226 1st
* #2c → 3.35mA

pg 229 # 1-7